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Chemically modified Graphene: Platform for tailored materials

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Graphene oxide is a chemically modified form of graphene. With its ease of synthesis, functionalization, reduction and processing possibilities it emerges as a highly versatile nano-building block for the development of functional graphene-like materials of use for real-world applications. The importance of effective synthesis strategies and processing routes to profit at maximum from graphene oxide's surprising properties up to the proof of concept in different types of applications will be described by several examples of our ongoing research:

1.) The first examples refers to the processing of graphene oxide into conductive films and paper-like materials and its use as capacitative transducer material or direct electrode for improved potentiometric sensing of ions, living microorganisms and organic analytes [1-4].

2.) The second example describes the combination of graphene oxide with intrinsically conducting polymers. With its unique ability to simultaneously act as electron acceptor and giant counter-ion it allows the formation of a stable solid-state charge-transfer complex stable and redispersible (processible) in aqueous dispersions [5]

3.) The last example focuses on the preparation of palladium nanoparticles (Pd-NPs) firmly supported on reduced graphene oxide (RGO) and the use of the corresponding Pd-NP/RGO hybrid material as efficient catalyst for hydrogenation reactions. Remaining oxygen functionalities play a critical role for the preparation as well as in the catalytic reactions [6]

References

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